CLAIMS

1. A phase shifter for switching passing phase of a high-frequency signal by means of ON/OFF control of a micro-machine switch, the micro-machine switch comprising:

first and second distributed constant lines arranged on a substrate to be spaced from each other,

a first control signal line connected electrically to the first or second distributed constant lines for application of a first control signal composed of a binary change in voltage,

a cantilever, one end of which is fixed to one of the first and second distributed constant lines and the other end of which is formed to be capable of coming toward and away from the other of the first and second distributed constant lines, the cantilever comprising an electrically conductive member,

a first insulating section formed in a region where the other of the first and second distributed constant lines faces the cantilever, and

a second insulating section for keeping a voltage value of the first control signal together with the first insulating section.

2. The phase shifter according to claim 1, wherein the first insulating section comprises an insulating film formed on at least one of an upper surface of the other of the first and second distributed constant lines and an underside of the cantilever.

3. The phase shifter according to claim 1, further comprising a first high-frequency signal blocking unit connected to the first control signal line to block passage of the high-frequency signal.

4. The phase shifter according to claim 3, wherein the first high-frequency signal blocking unit comprises:

a high-impedance line connected at one end thereof to that one of the first and second distributed constant lines, to which the first control signal line is connected electrically, and having an electric length of about one fourth as long as a wavelength of the high-frequency signal and a greater characteristic impedance than those of the first and second distributed constant lines, and

a low-impedance line connected at one end thereof to the other of the high-impedance line and opened at the other thereof, and having an electric length of about one fourth as long as a wavelength of the high-frequency signal and a smaller characteristic impedance than that of the high-impedance line, and

wherein the first control signal line is connected to the other end of the high-impedance line.

5. The phase shifter according to claim 3, wherein the first high-frequency signal blocking unit comprises:

a high-impedance line connected at one end thereof to that one of the first and second distributed constant lines, to which the first control signal line is connected electrically, and having an electric length of about one fourth as long as a wavelength of the high-frequency signal and a greater characteristic impedance than those of the first and second distributed constant lines, and

a capacitor with one of electrodes connected to the other of the high-impedance line and the other of electrodes connected to a grounding, and

wherein the first control signal line is connected to the other end of the high-impedance line.

6. The phase shifter according to claim 3, wherein the first high-frequency signal blocking unit comprises an inductance element.

7. The phase shifter according to claim 3, wherein the first high-frequency signal blocking unit comprises a resistor element having a sufficiently greater impedance than characteristic impedance of the first and second distributed constant lines.

8. The phase shifter according to claim 7, wherein the resistor element is insertion connected in series to the first control signal line.

9. The phase shifter according to claim 7, wherein the resistor element is connected at one end thereof to the first control signal line and opened at the other end thereof.

10. The phase shifter according to claim 1, further comprising a fourth control signal line connected electrically to that one of the first and second distributed constant lines, to which the first control signal line is not connected electrically, for charging and discharging electric charges generated by electrostatic induction.

11. The phase shifter according to claim 1, further comprising:

a fourth control signal line connected electrically to that one of the first and second distributed constant lines, to which the first control signal line is not connected electrically, and for applying of constant voltage having a reverse polarity to that of the first control signal, and

a third insulating section formed on that one of the first and second distributed constant lines, to which the fourth control signal line is connected electrically, and for keeping a voltage value of the constant voltage applied from the fourth control signal line together with the second insulating film section.

12. The phase shifter according to claim 10, further comprising a second high-frequency signal blocking unit connected to the fourth control signal line to block passage of the high-frequency signal.

13. The phase shifter according to claim 11, further comprising a second high-frequency signal blocking unit connected to the fourth control

signal line to block passage of the high-frequency signal.

14. The phase shifter according to claim 12 or 13, wherein the second high-frequency signal blocking unit comprises:

a high-impedance line connected at one end thereof to that one of the first and second distributed constant lines, to which the first control signal line is not connected electrically, and having an electric length of about one fourth as long as a wavelength of the high-frequency signal and a greater characteristic impedance than those of the first and second distributed constant lines, and

a low-impedance line connected at one end thereof to the other end of the high-impedance line and opened at the other end thereof, and having an electric length of about one fourth as long as a wavelength of the high-frequency signal and a smaller characteristic impedance than that of the high-impedance line, and

wherein the fourth control signal line is connected to the other end of the high-impedance line.

15. The phase shifter according to claim 12 or 13, wherein the second high-frequency signal blocking unit comprises:

a high-impedance line connected at one end thereof to that one of the first and second distributed constant lines, to which the first control signal line is not connected electrically, and having an electric length of about one fourth as long as a wavelength of the high-frequency signal and a greater characteristic impedance than those of the first and second distributed constant lines, and

a capacitor having one of electrodes connected to the other of the high-impedance line, and the other of electrodes connected to a grounding, and

wherein the fourth control signal line is connected to the other end of the high-impedance line.

16. The phase shifter according to claim 12 or 13, wherein the second high-frequency signal blocking unit comprises an inductance element.

17. The phase shifter according to claim 12 or 13, wherein the second high-frequency signal blocking unit comprises a resistor element having a sufficiently greater impedance than characteristic impedance of the first and second distributed constant lines.

18. The phase shifter according to claim 17, wherein the resistor element is insertion connected in series to the fourth control signal line.

19. The phase shifter according to claim 17, wherein the resistor element is connected at one end thereof to the fourth control signal line and opened at the other end thereof.

20. The phase shifter according to claim 1, further comprising first and second high-impedance lines connected at one ends thereof to the first and second distributed constant lines, and having an electric length of about one fourth as long as a wavelength of the high-frequency signal and a greater characteristic impedance than those of the first and second distributed constant lines, and

a capacitor with one of electrodes connected to the other of the first high-impedance line and the other of electrodes connected to the other of the second high-impedance line,

wherein the first high-impedance line is connected at the other end thereof to the first control signal line, and

wherein the second high-impedance line is connected at the other end thereof to a grounding.

21. A phase shifter comprising:

a main line, through which a high-frequency signal is transmitted,

a first distributed constant line connected to the main line and opened at a tip end thereof,

a second distributed constant line arranged to be spaced from the tip end of the first distributed constant line and opened at a tip end thereof,

a cantilever, one end of which is fixed to one of the first and second distributed constant lines and the other end of which is formed to be capable of coming toward and away from the other of the first and second distributed constant lines, the cantilever comprising an electrically conductive member,

a first control signal line connected electrically to the first or second distributed constant line and for applying of a first control signal composed of a binary change in voltage,

a first insulating section formed in a region where the other of the first and second distributed constant lines faces the cantilever, and

a second insulating section for keeping a voltage value of the first control signal together with the first insulating section.

22. The phase shifter according to claim 21, wherein the second insulating section comprises two capacitors formed midway the main line, and

the first distributed constant line and the first control signal line are both connected electrically to the main line between the two capacitors.

23. The phase shifter according to claim 21, wherein the first control signal line is connected electrically to the second distributed constant line, and the second insulating section is composed of the opened end of the second distributed constant line.

24. The phase shifter according to claim 21, wherein the first insulating section comprises an insulating film formed on at least one of an upper surface of the other of the first and second distributed constant lines and an underside of the cantilever.

25. The phase shifter according to claim 21, further comprising a first high-frequency signal blocking unit connected to the first control signal

line to block passage of the high-frequency signal.

26. The phase shifter according to claim 25, wherein the first high-frequency signal blocking unit comprises:

a high-impedance line connected at one end thereof to that one of the first and second distributed constant lines, to which the first control signal line is connected electrically, and having an electric length of about one fourth as long as a wavelength of the high-frequency signal and a greater characteristic impedance than those of the first and second distributed constant lines, and

a low-impedance line connected at one end thereof to the other of the high-impedance line and opened at the other end thereof, and having an electric length of about one fourth as long as a wavelength of the high-frequency signal and a smaller characteristic impedance than that of the high-impedance line, and

wherein the first control signal line is connected to the other end of the high-impedance line.

27. The phase shifter according to claim 25, wherein the first high-frequency signal blocking unit comprises:

a high-impedance line connected at one end thereof to that one of the first and second distributed constant lines, to which the first control signal line is connected electrically, and having an electric length of about one fourth as long as a wavelength of the high-frequency signal and a greater characteristic impedance than those of the first and second distributed constant lines, and

a capacitor having one of electrodes connected to the other of the high-impedance line, and the other of electrodes connected to a grounding, and

wherein the first control signal line is connected to the other end of the high-impedance line.

28. The phase shifter according to claim 25, wherein the first high-frequency signal blocking unit comprises an inductance element.

29. The phase shifter according to claim 25, wherein the first high-frequency signal blocking unit comprises a resistor element having a sufficiently greater impedance than those of the first and second distributed constant lines.

30. The phase shifter according to claim 29, wherein the resistor element is insertion connected in series to the first control signal line.

31. The phase shifter according to claim 29, wherein the resistor element is connected at one end thereof to the first control signal line and opened at the other end thereof.

32. The phase shifter according to claim 21, further comprising a fourth control signal line connected electrically to that one of the first and second distributed constant lines, to which the first control signal line is not connected, for charging and discharging electric charges generated by electrostatic induction.

33. The phase shifter according to claim 21, further comprising:

a fourth control signal line connected electrically to that one of the first and second distributed constant lines, to which the first control signal line is not connected electrically, for applying of constant voltage of reverse polarity to that of the first control signal, and

a third insulating section formed on that one of the first and second distributed constant lines, to which the fourth control signal line is connected electrically, for keeping a voltage value of the constant voltage applied from the fourth control signal line together with the second insulating section.

34. The phase shifter according to claim 32, further comprising a second high-frequency signal blocking unit connected to the fourth control signal line to block passage of the high-frequency signal.

35. The phase shifter according to claim 33, further comprising a second high-frequency signal blocking unit connected to the fourth control signal line to block passage of the high-frequency signal.

36. The phase shifter according to claim 34 or 35, wherein the second high-frequency signal blocking unit comprises:

a high-impedance line connected at one end thereof to that one of the first and second distributed constant lines, to which the first control signal line is not connected electrically, and having an electric length of about one fourth as long as a wavelength of the high-frequency signal and a greater characteristic impedance than those of the first and second distributed constant lines, and

a low-impedance line connected at one end thereof to the other end of the high-impedance line and opened at the other end thereof, and having an electric length of about one fourth as long as a wavelength of the high-frequency signal and a smaller characteristic impedance than that of the high-impedance line, and

wherein the fourth control signal line is connected to the other end of the high-impedance line.

37. The phase shifter according to claim 34 or 35, wherein the second high-frequency signal blocking unit comprises:

a high-impedance line connected at one end thereof to that one of the first and second distributed constant lines, to which the first control signal line is not connected electrically, and having an electric length of about one fourth as long as a wavelength of the high-frequency signal and a greater characteristic impedance than those of the first and second distributed constant lines, and

a capacitor with one of electrodes connected to the other of the high-impedance line and the other of electrodes connected to a grounding, and

wherein the fourth control signal line is connected to the other end of the high-impedance line.

38. The phase shifter according to claim 34 or 35, wherein the second high-frequency signal blocking unit comprises an inductance element.

39. The phase shifter according to claim 34 or 35, wherein the second high-frequency signal blocking unit comprises a resistor element having a sufficiently greater impedance than those of the first and second distributed constant lines.

40. The phase shifter according to claim 39, wherein the resistor element is insertion connected in series to the fourth control signal line.

41. The phase shifter according to claim 39, wherein the resistor element is connected at one end thereof to the fourth control signal line and opened at the other end thereof.

42. The phase shifter according to claim 21, further comprising first and second high-impedance lines connected at one ends thereof to the first and second distributed constant lines, and having an electric length of about one fourth as long as a wavelength of the high-frequency signal and a greater characteristic impedance than those of the first and second distributed constant lines, and

a capacitor with one of electrodes connected to the other of the first high-impedance line and the other of electrodes connected to the other of the second high-impedance line,

wherein the first high-impedance line is connected at the other end thereof to the first control signal line, and

wherein the second high-impedance line is connected at the other end thereof to a grounding.

43. A phase shifter comprising:

a main line, through which a high-frequency signal is transmitted,

a first distributed constant line connected to the main line and opened at a tip end thereof,

a grounding arranged to be spaced from the tip end of the first distributed constant line,

a cantilever, one end of which is fixed to one of the first and second distributed constant lines and the other end of which is formed to be capable of coming toward and away from the other of the first and second distributed constant lines, the cantilever comprising an electrically conductive member,

a first control signal line connected electrically to the first or second distributed constant line and for applying of a first control signal composed of a binary change in voltage,

a first insulating section formed in a region where the other of the first and second distributed constant lines faces the cantilever, and

a second insulating section for keeping a voltage value of the first control signal together with the first insulating section.

44. The phase shifter according to claim 43, wherein the second insulating section comprises two capacitors formed midway the main line, and the first distributed constant line and the first control signal line are both connected electrically to the main line between the two capacitors.

45. The phase shifter according to claim 43, wherein the first control signal line is connected electrically to the second distributed constant line, and the second insulating section is composed of the opened end of the second distributed constant line.

46. The phase shifter according to claim 43, wherein the first insulating section comprises an insulating film formed on at least one of an upper surface of the other of the first and second distributed constant lines and an underside of the cantilever.

47. The phase shifter according to claim 43, further comprising a first high-frequency signal blocking unit connected to the first control signal line to block passage of the high-frequency signal.

48. The phase shifter according to claim 47, wherein the first high-frequency signal blocking unit comprises:

a high-impedance line connected at one end thereof to that one of the first and second distributed constant lines, to which the first control signal line is connected electrically, and having an electric length of about one fourth as long as a wavelength of the high-frequency signal and a greater characteristic impedance than those of the first and second distributed constant lines, and

a low-impedance line connected at one end thereof to the other of the high-impedance line and opened at the other end thereof, and having an electric length of about one fourth as long as a wavelength of the high-frequency signal and a smaller characteristic impedance than that of the high-impedance line, and

wherein the first control signal line is connected to the other end of the high-impedance line.

49. The phase shifter according to claim 47, wherein the first high-frequency signal blocking unit comprises:

a high-impedance line connected at one end thereof to that one of the first and second distributed constant lines, to which the first control signal line is connected electrically, and having an electric length of about one fourth as long as a wavelength of the high-frequency signal and a greater characteristic impedance than those of the first and second distributed constant lines, and

a capacitor with one of electrodes connected to the other of the high-impedance line and the other of electrodes connected to a grounding, and

wherein the first control signal line is connected to the other end of the high-impedance line.

50. The phase shifter according to claim 47, wherein the first high-frequency signal blocking unit comprises an inductance element.

51. The phase shifter according to claim 47, wherein the first high-frequency signal blocking unit comprises a resistor element having a sufficiently greater impedance than those of the first and second distributed constant lines.

52. The phase shifter according to claim 51, wherein the resistor element is insertion connected in series to the first control signal line.

53. The phase shifter according to claim 51, wherein the resistor element is connected at one end thereof to the first control signal line and opened at the other end thereof.

54. The phase shifter according to claim 43, further comprising a fourth control signal line connected electrically to that one of the first and second distributed constant lines, to which the first control signal line is not connected electrically, for charging and discharging electric charge generated by electrostatic induction.

55. The phase shifter according to claim 43, further comprising:

a fourth control signal line connected electrically to that one of the first and second distributed constant lines, to which the first control signal line is not connected electrically, and for applying of constant voltage having a reverse polarity to that of the first control signal, and

a third insulating section formed on that one of the first and second distributed constant lines, to which the fourth control signal line is connected electrically, and for keeping a voltage value of the constant voltage applied from the fourth control signal line together with the second insulating section.

56. The phase shifter according to claim 54, further comprising a second high-frequency signal blocking unit connected to the fourth control signal line to block passage of the high-frequency signal.

57. The phase shifter according to claim 55, further comprising a second high-frequency signal blocking unit connected to the fourth control signal line to block passage of the high-frequency signal.

58. The phase shifter according to claim 56 or 57, wherein the second high-frequency signal blocking unit comprises:

a high-impedance line connected at one end thereof to that one of the first and second distributed constant lines, to which the first control signal line is not connected electrically, and having an electric length of about one fourth as long as a wavelength of the high-frequency signal and a greater characteristic impedance than those of the first and second distributed constant lines, and

a low-impedance line connected at one end thereof to the other end of the high-impedance line and opened at the other end thereof, and having an electric length of about one fourth as long as a wavelength of the high-frequency signal and a smaller characteristic impedance than that of the high-impedance line, and

wherein the fourth control signal line is connected to the other end of the high-impedance line.

59. The phase shifter according to claim 56 or 57, wherein the second high-frequency signal blocking unit comprises:

a high-impedance line connected at one end thereof to that one of the first and second distributed constant lines, to which the first control signal line is not connected electrically, and having an electric length of about one fourth as long as a wavelength of the high-frequency signal and a greater characteristic impedance than those of the first and second distributed constant lines, and

a capacitor with one of electrodes connected to the other of the high-impedance line and the other of electrodes connected to a grounding, and

wherein the fourth control signal line is connected to the other end of the high-impedance line.

60. The phase shifter according to claim 56 or 57, wherein the second high-frequency signal blocking unit comprises an inductance element.

61. The phase shifter according to claim 56 or 57, wherein the second high-frequency signal blocking unit comprises a resistor element having a sufficiently greater impedance than characteristic impedance of the first and second distributed constant lines.

62. The phase shifter according to claim 61, wherein the resistor element is insertion connected in series to the fourth control signal line.

63. The phase shifter according to claim 61, wherein the resistor element is connected at one end thereof to the fourth control signal line and opened at the other end thereof.

64. The phase shifter according to claim 43, further comprising first and second high-impedance lines connected at one ends thereof to the first and second distributed constant lines, and having an electric length of about one fourth as long as a wavelength of the high-frequency signal and a greater characteristic impedance than those of the first and second distributed constant lines, and

a capacitor with one of electrodes connected to the other of the first high-impedance line and the other of electrodes connected to the other of the second high-impedance line,

wherein the first high-impedance line is connected at the other end thereof to the first control signal line, and

wherein the second high-impedance line is connected at the other end thereof to a grounding.

65. A phase shifter including a first distributed constant line with a cut part, two second distributed constant lines having different electric length from each other, and a micro-machine switch for switching the second distributed constant lines, which short-circuits the cut part of the first distributed constant line to vary passing phase of a high-frequency signal, the micro-machine switch comprising:

cantilevers provided every second distributed constant line, one ends of the cantilevers being fixed to one of the first and second distributed constant lines and the other ends of the cantilevers being formed to be capable of coming toward and away from the other of the first and second distributed constant lines, the cantilevers comprising electrically conductive members,

a second control signal line connected electrically to one of the second distributed constant lines for application of a second control signal composed of a binary change in voltage,

a third control signal line connected electrically to the other of the second distributed constant lines for application of a third control signal complementary to the second control signal,

first insulating sections, respectively, formed in regions where the other of the first and second distributed constant lines faces the cantilevers, and

a second insulating section for keeping a voltage value of the second and third control signals together with the first insulating sections,

the second and third control signal lines constituting a first control signal line.

66. The phase shifter according to claim 65, wherein the cantilevers, respectively, are provided on both ends of the respective

second distributed constant lines.

67. The phase shifter according to claim 65, wherein the first insulating section comprises an insulating film formed on at least one of an upper surface of the other of the first and second distributed constant lines and an underside of the cantilever.

68. The phase shifter according to claim 65, further comprising a first high-frequency signal blocking unit connected to the first control signal line to block passage of the high-frequency signal.

69. The phase shifter according to claim 65, wherein the first high-frequency signal blocking unit comprises:

a high-impedance line connected at one end thereof to that one of the first and second distributed constant lines, to which the first control signal line is connected electrically, and having an electric length of about one fourth as long as a wavelength of the high-frequency signal and a greater characteristic impedance than those of the first and second distributed constant lines, and

a low-impedance line connected at one end thereof to the other of the high-impedance line and opened at the other end thereof, and having an electric length of about one fourth as long as a wavelength of the high-frequency signal and a smaller characteristic impedance than that of the high-impedance line, and

wherein the first control signal line is connected to the other end of the high-impedance line.

70. The phase shifter according to claim 65, wherein the first high-frequency signal blocking unit comprises:

a high-impedance line connected at one end thereof to that one of the first and second distributed constant lines, to which the first control signal line is connected electrically, and having an electric length of about one fourth as long as a wavelength of the high-frequency signal and a

greater characteristic impedance than those of the first and second distributed constant lines, and

a capacitor with one of electrodes connected to the other of the high-impedance line and the other of electrodes connected to a grounding, and

wherein the first control signal line is connected to the other end of the high-impedance line.

71. The phase shifter according to claim 65, wherein the first high-frequency signal blocking unit comprises an inductance element.

72. The phase shifter according to claim 65, wherein the first high-frequency signal blocking unit comprises a resistor element having a sufficiently greater impedance than characteristic impedance of the first and second distributed constant lines.

73. The phase shifter according to claim 72, wherein the resistor element is insertion connected in series to the first control signal line.

74. The phase shifter according to claim 72, wherein the resistor element is connected at one end thereof to the first control signal line and opened at the other end thereof.

75. The phase shifter according to claim 65, further comprising a fourth control signal line connected electrically to that one of the first and second distributed constant lines, to which the first control signal line is not connected electrically, for charging and discharging electric charges generated by electrostatic induction.

76. The phase shifter according to claim 65, further comprising:

a fourth control signal line connected electrically to that one of the first and second distributed constant lines, to which the first control signal line is not connected electrically, and for applying of constant voltage having a reverse polarity to that of the first control signal, and

a third insulating section formed on that one of the first and second distributed constant lines, to which the fourth control signal line is connected electrically, and for keeping a voltage value of the constant voltage applied from the fourth control signal line together with the second insulating section.

77. The phase shifter according to claim 75, further comprising a second high-frequency signal blocking unit connected to the fourth control signal line to block passage of the high-frequency signal.

78. The phase shifter according to claim 76, further comprising a second high-frequency signal blocking unit connected to the fourth control signal line to block passage of the high-frequency signal.

79. The phase shifter according to claim 77 or 78, wherein the second high-frequency signal blocking unit comprises:

a high-impedance line connected at one end thereof to that one of the first and second distributed constant lines, to which the first control signal line is not connected electrically, and having an electric length of about one fourth as long as a wavelength of the high-frequency signal and a greater characteristic impedance than those of the first and second distributed constant lines, and

a low-impedance line connected at one end thereof to the other end of the high-impedance line and opened at the other end thereof, and having an electric length of about one fourth as long as a wavelength of the high-frequency signal and a smaller characteristic impedance than that of the high-impedance line, and

wherein the fourth control signal line is connected to the other end of the high-impedance line.

80. The phase shifter according to claim 77 or 78, wherein the second high-frequency signal blocking unit comprises:

a high-impedance line connected at one end thereof to that one of the first and second distributed constant lines, to which the first control signal line is not connected electrically, and having an electric length of about one fourth as long as a wavelength of the high-frequency signal and a greater characteristic impedance than those of the first and second distributed constant lines, and

a capacitor with one of electrodes connected to the other of the high-impedance line and the other of electrodes connected to a grounding, and

wherein the fourth control signal line is connected to the other end of the high-impedance line.

81. The phase shifter according to claim 77 or 78, wherein the second high-frequency signal blocking unit comprises an inductance element.

82. The phase shifter according to claim 77 or 78, wherein the second high-frequency signal blocking unit comprises a resistor element having a sufficiently greater impedance than characteristic impedance of the first and second distributed constant lines.

83. The phase shifter according to claim 82, wherein the resistor element is insertion connected in series to the fourth control signal line.

84. The phase shifter according to claim 82, wherein the resistor element is connected at one end thereof to the fourth control signal line and opened at the other end thereof.

85. The phase shifter according to claim 65, further comprising first and second high-impedance lines connected at one ends thereof to the first and second distributed constant lines, and having an electric length of about one fourth as long as a wavelength of the high-frequency signal and a greater characteristic impedance than those of the first and second distributed constant lines, and

a capacitor with one of electrodes connected to the other of the first high-impedance line and the other of electrodes connected to the other of the second high-impedance line,

wherein the first high-impedance line is connected at the other end thereof to the first control signal line, and

wherein the second high-impedance line is connected at the other end thereof to a grounding.

86. A phase shifter including a first distributed constant line with a cut part, two second distributed constant lines having different electric length from each other, and a micro-machine switch for switching the second distributed constant lines, which short-circuit the cut part of the first distributed constant line to vary passing phase of a high-frequency signal, the micro-machine switch comprising:

cantilevers provided every second distributed constant line, one ends of the cantilevers being fixed to one of the first and second distributed constant lines and the other ends of the cantilevers being formed to be capable of coming toward and away from the other of the first and second distributed constant lines, the cantilevers comprising electrically conductive members,

a first control signal line connected electrically to the first distributed constant line for application of a first control signal composed of a binary change in voltage,

first insulating sections, respectively, formed in regions where the other of the first and second distributed constant lines faces the cantilevers, and

a second insulating section for keeping a voltage value of the first control signal together with the first insulating sections, and

wherein constant voltages, respectively, equivalent to respective voltage values of two states of the first control signal are applied to the

respective second distributed constant lines.

87. The phase shifter according to claim 86, wherein the cantilevers, respectively, are provided on both ends of the respective second distributed constant lines.

88. The phase shifter according to claim 86, wherein the first insulating section comprises an insulating film formed on at least one of an upper surface of the other of the first and second distributed constant lines and an underside of the cantilever.

89. The phase shifter according to claim 86, further comprising a first high-frequency signal blocking unit connected to the first control signal line to block passage of the high-frequency signal.

90. The phase shifter according to claim 89, wherein the first high-frequency signal blocking unit comprises:

a high-impedance line connected at one end thereof to that one of the first and second distributed constant lines, to which the first control signal line is connected electrically, and having an electric length of about one fourth as long as a wavelength of the high-frequency signal and a greater characteristic impedance than those of the first and second distributed constant lines, and

a low-impedance line connected at one end thereof to the other of the high-impedance line and opened at the other end thereof, and having an electric length of about one fourth as long as a wavelength of the high-frequency signal and a smaller characteristic impedance than that of the high-impedance line, and

wherein the first control signal line is connected to the other end of the high-impedance line.

91. The phase shifter according to claim 89, wherein the first high-frequency signal blocking unit comprises:

a high-impedance line connected at one end thereof to that one of the first and second distributed constant lines, to which the first control signal line is connected electrically, and having an electric length of about one fourth as long as a wavelength of the high-frequency signal and a greater characteristic impedance than those of the first and second distributed constant lines, and

a capacitor with one of electrodes connected to the other of the high-impedance line and the other of electrodes connected to a grounding, and

wherein the first control signal line is connected to the other end of the high-impedance line.

92. The phase shifter according to claim 89, wherein the first high-frequency signal blocking unit comprises an inductance element.

93. The phase shifter according to claim 89, wherein the first high-frequency signal blocking unit comprises a resistor element having a sufficiently greater impedance than characteristic impedance of the first and second distributed constant lines.

94. The phase shifter according to claim 93, wherein the resistor element is insertion connected in series to the first control signal line.

95. The phase shifter according to claim 93, wherein the resistor element is connected at one end thereof to the first control signal line and opened at the other end thereof.

96. The phase shifter according to claim 86, further comprising a fourth control signal line connected electrically to that one of the first and second distributed constant lines, to which the first control signal line is not connected, and for charging and discharging electric charges generated by electrostatic induction.

97. The phase shifter according to claim 86, further comprising:

a fourth control signal line connected electrically to that one of the

first and second distributed constant lines, to which the first control signal line is not connected electrically, and for applying of constant voltage having a reverse polarity to that of the first control signal, and

a third insulating section formed on that one of the first and second distributed constant lines, to which the fourth control signal line is connected electrically, and for keeping a voltage value of the constant voltage applied from the fourth control signal line together with the second insulating section.

98. The phase shifter according to claim 96, further comprising a second high-frequency signal blocking unit connected to the fourth control signal line to block passage of the high-frequency signal.

99. The phase shifter according to claim 97, further comprising a second high-frequency signal blocking unit connected to the fourth control signal line to block passage of the high-frequency signal.

100. The phase shifter according to claim 98 or 99, wherein the second high-frequency signal blocking unit comprises:

a high-impedance line connected at one end thereof to that one of the first and second distributed constant lines, to which the first control signal line is not connected electrically, and having an electric length of about one fourth as long as a wavelength of the high-frequency signal and a greater characteristic impedance than those of the first and second distributed constant lines, and

a low-impedance line connected at one end thereof to the other end of the high-impedance line and opened at the other end thereof, and having an electric length of about one fourth as long as a wavelength of the high-frequency signal and a smaller characteristic impedance than that of the high-impedance line, and

wherein the fourth control signal line is connected to the other end of the high-impedance line.

101. The phase shifter according to claim 98 or 99, wherein the second high-frequency signal blocking unit comprises:

a high-impedance line connected at one end thereof to that one of the first and second distributed constant lines, to which the first control signal line is not connected electrically, and having an electric length of about one fourth as long as a wavelength of the high-frequency signal and a greater characteristic impedance than those of the first and second distributed constant lines, and

a capacitor with one of electrodes connected to the other of the high-impedance line and the other of electrodes connected to a grounding, and

wherein the fourth control signal line is connected to the other end of the high-impedance line.

102. The phase shifter according to claim 98 or 99, wherein the second high-frequency signal blocking unit comprises an inductance element.

103. The phase shifter according to claim 98 or 99, wherein the second high-frequency signal blocking unit comprises a resistor element having a sufficiently greater impedance than those of the first and second distributed constant lines.

104. The phase shifter according to claim 103, wherein the resistor element is insertion connected in series to the fourth control signal line.

105. The phase shifter according to claim 103, wherein the resistor element is connected at one end thereof to the fourth control signal line and opened at the other end thereof.

106. The phase shifter according to claim 86, further comprising first and second high-impedance lines connected at one ends thereof to the first and second distributed constant lines, and having an electric length of about one fourth as long as a wavelength of the high-frequency

signal and a greater characteristic impedance than those of the first and second distributed constant lines, and

a capacitor with one of electrodes connected to the other of the first high-impedance line and the other of electrodes connected to the other of the second high-impedance line,

wherein the first high-impedance line is connected at the other end thereof to the first control signal line, and

wherein the second high-impedance line is connected at the other end thereof to a grounding.

107. A method of manufacturing a phase shifter, comprising:

a first step of forming on a substrate a portion of a main line, a first distributed constant line connected to the portion of the main line, a second distributed constant line, an end of which is spaced from an end of the first distributed constant line, and a control signal line connected to the portion of the main line;

a second step of forming a sacrificing layer in a region extending from a gap between the first and second distributed constant lines to the end of the first or second distributed constant line;

a third step of forming a first insulating film on that portion of the sacrificing layer, which faces the end of the first or second distributed constant line, and a second insulating film on both ends of the portion of the main line;

a fourth step of forming a cantilever of metal on an area extending from that end of the second or first distributed constant line, on which the sacrificing layer is not formed, to the first insulating film on the sacrificing layer, and at the same time forming other portions of the main line on the second insulating film and the substrate; and

a fifth step of removing the sacrificing layer.